

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/JP2005/016204

International filing date (day/month/year)
30.08.2005

Priority date (day/month/year)
02.09.2004

International Patent Classification (IPC) or both national classification and IPC
H04B1/69, H04L1/08, H04L1/00

Applicant
MATSUSHITA ELECTRIC INDUSTRIAL CO, LTD.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE
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International application No.
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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. II Priority

1. ☒ The validity of the priority claim has not been considered because the International Searching Authority does not have in its possession a copy of the earlier application whose priority has been claimed or, where required, a translation of that earlier application. This opinion has nevertheless been established on the assumption that the relevant date (Rules 43*bis*.1 and 64.1) is the claimed priority date.
2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

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Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-13
	No: Claims	
Inventive step (IS)	Yes: Claims	1-13
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-13
	No: Claims	

2. Citations and explanations

see separate sheet

**WRITTEN OPINION OF THE
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AUTHORITY (SEPARATE SHEET)**

International application No.

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Re Item V.

- 1 Reference is made to the following document:

D1 : YAMAMOTO N ET AL: "Adaptive internally turbo-coded ultra wideband-impulse radio (AIRC-UWB-IR) system" ICC 2003. 2003 IEEE INTERNATIONAL CONFERENCE ON COMMUNICATIONS. ANCHORAGE, AK, MAY 11 - 15, 2003, IEEE INTERNATIONAL CONFERENCE ON COMMUNICATIONS, NEW YORK, NY : IEEE, US, vol. VOL. 1 OF 5, 11 May 2003 (2003-05-11), pages 3535-3539, XP010643102 ISBN: 0-7803-7802-4

- 2 Document D1, which is considered to represent the most relevant state of the art, discloses (see abstract; point III.A. on page 3537; figure 4) an UWB system and corresponding method where information bits are first turbo-encoded, then repeated, modulated and finally transmitted. The coding rate and the repetition rate are varied according to the conditions of the channel.

From this, the subject-matter of independent claim 1 differs in that D1 can vary the repetition factors for encoded bits, but it does not specify that such variation can be effected on encoded bits which have been derived from the same set of information bits (k).

- 2.1 The subject-matter of the independent claims 1,2,3,12 and 13 is therefore novel (Article 33(2) PCT)

The problem to be solved by the present invention may be regarded as how to provide unequal error protection for individual bits.

- 2.2 The solution to this problem proposed by the independent claims of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

Document D1 varies the repetition rate so that series of encoded bits can be given different repetition factors. However, the variation of the repetition rate implies a variation of the coding rate so that such changes can not be made until the current

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information packet has been coded. The next information packet can be then coded and repeated according to new rates. By differently repeating encoded bits which belong to the same "block", unequal error protection can be achieved. For instance, systematic bits can be given higher protection than parity bits, thereby improving the turbo decoding at the receiver.